PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 04 JUL 2005

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Applicant's or agent's file reference 158081 S-KR	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)

International application No. PCT/NO2004/000123	International filing date (day/month/year) 29.04.2004	Priority date (day/month/year) 29.04.2003

International Patent Classification (IPC) or both national classification and IPC

H04L12/00, H04L29/00

Applicant

TELENOR ASA et al.

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 6 sheets.

3. This report contains indications relating to the following items:

   I ☒ Basis of the opinion

   II ☐ Priority

   III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

   IV ☐ Lack of unity of invention

   V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

   VI ☐ Certain documents cited

   VII ☐ Certain defects in the international application

   VIII ☐ Certain observations on the international application

Date of submission of the demand 26.11.2004	Date of completion of this report 04.07.2005

Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Pereira, M Telephone No. +31 70 340-4322

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)):*

   Description, Pages

   1-18   as originally filed

   Claims, Numbers

   1-11   received on 06.06.2005 with letter of 06.06.2005

   Drawings, Sheets

   1/10-10/10   as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description,   pages:

   ☐ the claims,   Nos.:

   ☐ the drawings,   sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

   Novelty (N)   Yes: Claims   1-11
                                No: Claims

   Inventive step (IS)   Yes: Claims   1-11
                                No: Claims

   Industrial applicability (IA) Yes: Claims   1-11
                                No: Claims

2. Citations and explanations

   see separate sheet

Re Item V
Reasoned statement under Article 35(2) with regards to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following document:
D1:   US 2003/026213 A1 (FRANK MICHAEL ET AL) 6 February 2003 (2003-02-06)

1   The present application satisfies the criterion set forth in Articles 33(2) and (3) PCT because the subject-matter of each of the independent claims 1, 3, 8 and 9 is new and involves an inventive step.

     D1, which represents the closest prior-art, discloses a virtual device composed of a multitude of stationary or/and portable devices forming a Personal Area Network (PAN) of Open, Primitive or/and Closed devices.

     The subject-matter of each of the claims 1, 3, 8 and 9 differs from D1 in that said virtual device further comprises a Personal Area Network middleware (PANM) capable of handling the heterogeneity and the dynamic of the devices through the maintenance of device profile, resources discovery, device redirection, application redirection, user profile management, PAN control and PAN API.

     The characterizing features of said claims have the advantage that said middleware allows to move the input or output stream from one device to another to achieve better presentation, and to move one application from one device to another to get an optimal execution.

     This is of utmost importance for allowing all the autonomous devices of the PAN to collaborate and work together as one virtual device optimizing therefore the execution of applications and obtaining better battery life, for example.

     Therefore, the subject-matter of each of said claims is considered to involve an inventive step.

2   Claims 2, 4-7, 10 and 11 are dependent on claims 1, 3, 8 and 9 and therefore are also novel and inventive.

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Claims

(Amended June 6, 2005)

1.   A Virtual Device composed of a multitude of stationary
and/or portable electronic devices, including a first Open
5   Device with an available inner structure and a network
interface, at least one Primitive Device arranged to
communicate with other devices and act as a pure slave to
said devices,
        c h a r a c t e r i z e d   i n   at least one Closed Device
10   with a closed inner structure and a network interface, said
open and closed devices being connected in a Personal Area
Network, a Personal Area Network middleware being installed
in said first Open Device, said first Open Device being
arranged to act as a Personal Area Network controller,
15   wherein
said Personal Area Network middleware is arranged to store
and maintain a device profile, said device profile
including information on at least identity, type,
capabilities and services offered by any Open, Closed or
20   Primitive Devices available for said Private Area Network,
said open device being arranged to discover and register
any devices present in said Personal Area Network,
said Personal Area Network middleware being arranged to
redirect an output stream from one device to an input port
25   on another device,
said Personal Area Network middleware being arranged to
redirect an application to a specific device present in
said Personal Area Network,
said Personal Area Network middleware being arranged to
30   store and maintain a user profile, said user profile
including information on at least which Open, Closed or
Primitive Devices that are members of said Private Area
Network, which Open, Closed or Primitive Devices that are
available for said Private Area Network, redirection
35   information, which Open, Closed or Primitive Devices that
should be visible on an external network, the distribution

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of services among Open or Closed Devices present, and the
distribution of resources among Open or Closed Devices
present,
said Personal Area Network middleware further including a
5 user interface enabling the user to control the Personal
Area Network middleware, and an Application Programming
Interface to said Personal Area Network middleware allowing
applications access to capabilities and functions in said
Personal Area Network middleware.

10 2.   A Virtual Device as claimed in claim 1,
c h a r a c t e r i z e d   i n a second Open Device
connected to said Personal Area Network.

3.   A Virtual Device composed of a multitude of stationary
and/or portable electronic devices, including an Open
15 Device with an available inner structure and a network
interface, at least one Primitive Device arranged to
communicate with other devices and act as a pure slave to
said devices,
c h a r a c t e r i z e d   i n at least one further Open
20 Device, at least one Closed Device with a closed inner
structure and a network interface, said open and closed
devices being connected in a Personal Area Network, a
Personal Area Network middleware being installed on said
Open Devices, said Personal Area Network Middleware being
25 distributed between said Open Devices, said Open Devices
being arranged to act as a Personal Area Network
controller, wherein
said Personal Area Network middleware is arranged to store
and maintain a device profile, said device profile
30 including information on at least identity, type,
capabilities and services offered by any Open, Closed or
Primitive Devices available for said Private Area Network,
said open devices being arranged to discover and register
any devices present in said Personal Area Network,
35 said Personal Area Network middleware being arranged to
redirect an output stream from one device to an input port

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on another device,
said Personal Area Network middleware being arranged to
redirect an application to a specific device present in
said Personal Area Network,

5   said Personal Area Network middleware being arranged to
store and maintain a user profile, said user profile
including information on at least which Open, Closed or
Primitive Devices that are members of said Private Area
Network, which Open, Closed or Primitive Devices that are
10   available for said Private Area Network, redirection
information, which Open, Closed or Primitive Devices that
should be visible on an external network, the distribution
of services among Open or Closed Devices present, and the
distribution of resources among Open or Closed Devices
15   present,
said Personal Area Network middleware further including a
user interface enabling the user to control the Personal
Area Network middleware, and an Application Programming
Interface to said Personal Area Network middleware allowing
20   applications access to capabilities and functions in said
Personal Area Network middleware,
each Open Device being arranged to invoke services running
on other Open Devices.

4.   A Virtual Device as claimed in claim 1, 2, or 3,
25   c h a r a c h t e r i z e d   i n   that at least one of
said Open or Closed Devices is equipped with a network
interface connected to an external network.

5.   A Virtual Device as claimed in claim 4,
c h a r a c h t e r i z e d   i n   a server in said
30   external network arranged to store a backup copy of
information stored in said Personal Area Network, and
synchronize said backup copy with said information.

6. A Virtual Device as claimed in claim 5,
c h a r a c h t e r i z e d   i n   that said open device or
35   devices is/are arranged to periodically poll the network.

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7. A Virtual Device as claimed in claim 3,
c h a r a c h t e r i z e d   i n   that a Web services
platform is installed on each Open Device for enabling each
Open Device to invoke Web services running on other Open
5   Devices.

8.   A Virtual Device composed of a multitude of portable
electronic devices, including an Open Device with an
available inner structure and a network interface, at least
one Primitive Device arranged to communicate with other
10   devices and act as a pure slave to said devices,
c h a r a c h t e r i z e d   i n   at least one Closed
Device with a closed inner structure and a network
interface, said at least one Closed Device being equipped
with a network interface connected to an external network
15   which includes a Personal Area Network server, a Personal
Area Network middleware being installed on said server,
said open and closed devices and said server forming a
Personal Area Network operated by said Personal Area
Network middleware, wherein
20   said Personal Area Network middleware is arranged to store
and maintain a device profile, said device profile
including information on at least identity, type,
capabilities and services offered by any Open, Closed or
Primitive Devices available for said Private Area Network,
25   said open device being arranged to discover and register
any devices present in said Personal Area Network,
said Personal Area Network middleware being arranged to
redirect an output stream from one device to an input port
on another device,
30   said Personal Area Network middleware being arranged to
redirect an application to a specific device present in
said Personal Area Network,
said Personal Area Network middleware being arranged to
store and maintain a user profile, said user profile
35   including information on at least which Open, Closed or
Primitive Devices that are members of said Private Area
Network, which Open, Closed or Primitive Devices that are

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available for said Private Area Network, redirection
information, which Open, Closed or Primitive Devices that
should be visible on an external network, the distribution
of services among Open or Closed Devices present, and the
5   distribution of resources among Open or Closed Devices
present,
said Personal Area Network middleware further including a
user interface enabling the user to control the Personal
Area Network middleware, and an Application Programming
10 Interface to said Personal Area Network middleware allowing
applications access to capabilities and functions in said
Personal Area Network middleware.

9.   A Virtual Device composed of a multitude of portable
electronic devices,
15 c h a r a c h t e r i z e d   i n   a Closed Device with a
closed inner structure and a network interface connected to
an external network, at least one Primitive Device arranged
to communicate with said Closed Device or devices and act
as a pure slave to said device or devices, a server in said
20 external network on which is installed a Personal Area
Network middleware, said server being arranged to
communicate with said closed device or devices in order to
act as a Personal Area Network controller, wherein
said Personal Area Network middleware is arranged to store
25 and maintain a device profile, said device profile
including information on at least identity, type,
capabilities and services offered by any Open, Closed or
Primitive Devices available for said Private Area Network,
said Personal Area Network middleware being arranged to
30 discover and register any devices present in said Personal
Area Network,
said Personal Area Network middleware being arranged to
redirect an output stream from one device to an input port
on another device,
35 said Personal Area Network middleware being arranged to
redirect an application to a specific device present in
said Personal Area Network,

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said Personal Area Network middleware being arranged to store and maintain a user profile, said user profile including information on at least which Open, Closed or Primitive Devices that are members of said Private Area

5   Network, which Open, Closed or Primitive Devices that are available for said Private Area Network, redirection information, which Open, Closed or Primitive Devices that should be visible on an external network, the distribution of services among Open or Closed Devices present, and the

10   distribution of resources among Open or Closed Devices present,
said Personal Area Network middleware further including a user interface enabling the user to control the Personal Area Network middleware, and an Application Programming

15   Interface to said Personal Area Network middleware allowing applications access to capabilities and functions in said Personal Area Network middleware,
said server being arranged to store a backup copy of information stored in said Personal Area Network, and

20   synchronize said backup copy with said information.

10. A Virtual Device as claimed in claim 9, c h a r a c h t e r i z e d   i n   that said server is arranged to periodically poll the network.

11. A Virtual Device as claimed in claim 1, 3, 8 or 9,
25   c h a r a c h t e r i z e d   i n   that said Application Programming Interface is implemented in Java or CORBA, or as an XML Web service.

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